

**METHOD FOR FORMING A SEMICONDUCTOR DEVICE WITH LOCAL  
SEMICONDUCTOR-ON-INSULATOR (SOI)**

Abstract of the Disclosure

5           A semiconductor on insulator transistor is formed beginning with a bulk silicon  
substrate. An active region is defined in the substrate and an oxygen-rich silicon layer that is  
monocrystalline is formed on a top surface of the active region. On this oxygen-rich silicon  
layer is grown an epitaxial layer of silicon. After formation of the epitaxial layer of silicon,  
the oxygen-rich silicon layer is converted to silicon oxide while at least a portion of the  
10 epitaxial layer of silicon remains as monocrystalline silicon. This is achieved by applying  
high temperature water vapor to the epitaxial layer. The result is a silicon on insulator  
structure useful for making a transistor in which the gate dielectric is on the remaining  
monocrystalline silicon, the gate is on the gate dielectric, and the channel is in the remaining  
monocrystalline silicon under the gate.

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